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The Influence of Psychotropic Flora and Fauna on Maya Religion

by Marlene Dobkin de Rios

INTRODUCTION

A systematic examination of Maya art from three major regions of southern Mesoamerica shows the following art motifs appearing with some regularity throughout the archaeological record, from Pre-Classic through Post-Conquest times: (a) mushroom stones and mushroom pottery, (b) the frog/toad motif, and (c) the water lily motif. Much has been written on the first and third motifs (see, in particular, De Borhegyi 1961, 1963, 1965; Wasson and Wasson 1957; Heim and Wasson 1958; Rands 1953, 1955). Most important to this discussion is the fact that all motifs are present in the three major Maya areas, although variation in frequency is noticeable. The thesis of this paper is that these motifs are related to and influenced by the psychotropic properties of the mushroom, water lily, and toad. It is hypothesized that these properties were known

to the Maya shaman, priest, and artist as well as generally diffused at a folk level in Pre-Classic times. This paper will attempt to shed light on the influence of such psychotropic use on Maya religion. The first part will examine psychotropic substances in general and how they affect man and then discuss the psychotropic properties and trace the distribution of representations of the mushroom, frog/toad, and water lily in ancient Maya art. The second part will reexamine Maya religion in the light of the possible use of psychotropic materials.

PSYCHOTROPIC SUBSTANCES

Psychotropic substances which affect the central nervous system of man have a complex pharmacology and chemistry still far from being completely known or understood. Although we can assume that the Maya shaman or priest knew as little as we do today in this realm, certain properties of these substances are readily observable from an empirical point of view. The term "psychotropic" generally refers to drugs which cause psychological change or modification of mental activity. Delay (1967) has distinguished three major types of psychotropic drugs: (1) psychic sedatives, which include narcotics, barbiturates, and tranquilizers; (2) psychic stimulants, drugs of mood change and control, including the amines; and (3) psychic deviators or hallucinogens, including mescaline, LSD, psilocybin, ayahuasca, etc. These latter seem to have received the greatest elaboration in the anthropological literature.

Social psychologists have attempted to typologize the overall effects of customs and chemicals which alter states of consciousness. Ten general characteristics of religious ecstasy states, mystical union, and drug-induced alterations in consciousness have been delineated by Ludwig (1969: 15-16):

1. Altered thinking: varying disturbances in concentration, attention, memory, and judgment.
2. Disturbed time sense: a sense of timelessness and the slowing down or the accelerating of time.
3. Loss of control, which may either be feared or, given particular cultural beliefs, willingly accepted in order to experience divinity or become a mouthpiece for the gods.
4. Change in emotional expression: expression of emotional extremes unlike those of normal waking hours, from

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The present paper, submitted in final form 28 XII 71, was sent for comment to 50 scholars, of whom the following responded: Norman Alger, N. Ross Crumrine, Peter T. Furst, Robert C. Harman, Nicholas M. Hellmuth, Nicholas A. Hopkins, William Clyde King, Joan D. Koss, Weston La Barre, Herbert J. Landar, Joseph K. Long, Tatiana Proskouriakoff, Arthur J. Rubel, Francisco Samaranich, J. Eric S. Thompson, and Roger W. Wescott. Their comments are printed after the text and are followed by a reply from the author.

ecstasy and orgiastic equivalents to profound fear, terror, and depression.

5. Changes in body image: various distortions, often with a profound sense of depersonalization; at times, schism between body and mind and feeling of dissolution of boundaries between one's self and others, the world, or the universe.

6. Perceptual distortions: increased visual imagery, hyperacuteness of perceptions, geometric patterns, synesthesias.

7. Change in meaning or significance: special significance attached to subjective experience, with great insight or profound feelings.

8. Sense of the ineffable: difficulty in communicating the nature of such experience to someone uninitiated.

9. Feeling of rejuvenation.

10. Hypersuggestibility: increased propensity to accept or respond to specific statements of the person guiding the session.

For the anthropologist, drug-induced alterations in consciousness are but one way in which man alters his world. However, the above material will be of use in the discussion to follow concerning the particular substances that may have been utilized by the Maya and may, as their art suggests, have influenced their world view.

THE MUSHROOM

Present-day Mexico contains over 20 species of mind-altering mushrooms, including species of *Psilocybe* and *Stropharia* (Heim and Wasson 1958:175). These mushrooms contain various alkaloids which produce alterations in consciousness. In fact, the drug psilocybin, synthesized in recent decades, comes from one of the major alkaloids in the mushroom of similar name. It is used quite extensively in therapy in Europe today and has been so used in recent times throughout the United States and Canada. Extant cultic use of these substances among Mixtec, Zapotec, and Mixe populations of Oaxaca has been reported on by Wasson and Wasson (1957), Heim and Wasson (1958), and De Borhegyi (1965).

De Borhegyi has written extensively about the corpus of over 100 mushroom stones and ceramics in southern Mesoamerica and has documented the presence of both stones and pottery in this motif throughout the Guatemalan highlands and parts of the central region (De Borhegyi, cited in Wasson and Wasson 1957; De Borhegyi 1961, 1965). Mushroom stones are found in the Early and Late Pre-Classic periods at Kaminaljuyú and Quiché and in the Late Pre-Classic and Early Classic at several sites in the central Guatemalan highlands and the Pacific Coast plains. In addition to the mushroom stones, mushroom pottery is found at a Proto-Classic level at El Bellote, Santa Cruz, Chiapa de Corzo, and Mirador; Early Classic pottery mushroom finds exist at Berriozabal and at a lowland site, and late Pre-Classic examples can be seen at Altar de Sacrificios (De Borhegyi 1963:330). The time range for pottery mushrooms is Early Pre-Classic through Late Classic, with a possible hiatus during the Early Classic (De Borhegyi 1963:335). The distribution of mushroom stones and pottery mushrooms overlaps in Tabasco, Chiapas, and El Salvador, while mushroom stones are numerous in all parts of highland Guatemala.

De Borhegyi believes that pottery mushrooms and mushroom stones were used in sacred ceremonies of pre-Columbian times, with ritual consumption of psychotropic mushrooms to induce hallucinatory experiences. He sees support for cultic associations in the occurrence of many of these plain pottery mushroom-like objects in tombs containing luxury objects such as carved shell gorgets and

jade beads. He points out that these pottery objects are present in areas where stone for carving was abundant and that they were manufactured from local clay and in prevalent local styles. He has also pointed out (1965:17) that in those areas of the Guatemalan highlands where mushroom stones appear from Pre-Classic times on, no record of hallucinogenic mushrooms can be found in plant lists, nor are such practices recorded in the region. In contrast, in one area where the hallucinogenic mushroom is still used today, Oaxaca, four mushroom stones have been found (De Borhegyi, cited in Wasson and Wasson 1957).

It is possible that psychotropic mushrooms were important trade items in the southern highlands, where active commerce with other parts of Middle America existed. Lowe and Mason (1965:196) have pointed out that the Pacific Coast plain was the principal overland route between Mexico and Central America in pre- and post-Hispanic times. Mixe territory is contiguous, and trade in these psychotropic substances may have occurred. Eccentric flints, for example, found (although rare) in the Guatemalan highlands, are believed to have originated in Guerrero (Thompson 1970:147). Salt, too, may have been exported from the Pacific Coast around Sacapulas to the highlands (Thompson 1970:149). Thompson points out that trade in pottery between various parts of the Maya area, and even with non-Maya regions, was brisk in Formative times as well. Early Classic burials in Kaminaljuyú contain many trade pieces from Central Mexico (Thompson 1954:178). Glazed plumbate ware depicting Mexican gods was traded throughout southern Guatemala. Thin orange pottery ware ranges as far afield as Kaminaljuyú, Teotihuacán, and Monte Albán, dating from the Early Classic period; Thompson sees this pottery type to have been manufactured in Central Mexico. It is quite possible that some of these trade goods were accompanied by psychotropic mushrooms as items offered for exchange.

To bolster the argument that mushroom stones and ceramics indicate use of the psychotropic mushrooms themselves, De Borhegyi (1965:37) has suggested that the use of aromatic pine resins for magical and religious ritual may be connected with such use. Throughout the primitive world where similar hallucinogenic drugs are used, odoriferous plants play an important part in heightening sensory responses during drug experiences. Elsewhere, I have pointed up the use of perfumed water (*agua florida*) in ayahuasca sessions (Dobkin de Rios 1972a). It is interesting in this context that when the mushroom motif disappears from the archaeological record, so does the three-pronged *incensario* in which pine resins were burned (De Borhegyi 1965:14).

Mushrooms are referred to in the *Popul Vuh* and the *Annals of the Kakchiquels* once each in association with religious activity (De Borhegyi 1965:281). Wasson and Wasson (1957:281) have pointed out that some of the later archaeological finds of mushroom stones are in parts of Mixe country, where contemporary mushroom use was documented in the late 1950s.

THE FROG/TOAD

Bufotenine, derived from the poison of the toad, has for the past few decades been a subject of experimentation among both human and primate populations (see Fabing and Hawkins 1956, 1957; Evarts 1956). An indole substance, it has been known as an adrenergic agent since its isolation by Wieland in 1934. In 1954, this substance was found in the seed of *Piptadenia peregrina* L., the cohoba snuff of the West Indies (Stowe 1959:266). Bufotenine is a

hallucinogenic drug which has dangerous cardiovascular effects in man and is usable only in low dosages. Its action affects central nervous system activity. Its passage through the blood-brain barrier, however, is still unclear. Some writers believe that hydroxy derivatives such as bufotenine do not have to penetrate the brain all the way, but some other trigger point like the hypothalamus or other area, in order to produce regional changes (Szara, cited in Efron 1970:377). Wassén (1934) and others have traced the importance of the frog/toad motif in New World art. To my knowledge, however, aside from an oblique reference to Shakespearean-type witches' brews and the use of toads therein, no one has yet attempted to link the frog/toad motif with the biochemical data. The argument of this paper clearly depends upon the identification of the toad as the major figure in art representations. However, some substantiation for this argument can be seen in the various analyses available of the codices and works of art themselves.

Tozzer and Allen (1910), in a study of animal figures in the Maya codices, use the terms "frog" and "toad" interchangeably, as it is never quite clear which of these related rain-associated amphibians is meant by the artist. They feel, indeed, that no distinction in treatment is made between the two (p. 309). The Maya word used for this motif (*uo*) is found in several places in the codices and stone carvings, yet Tozzer and Allen find it impossible to positively identify these representations with any of the numerous species of frog and toad occurring in Central America. In the Madrid Codex, this motif's common characteristics are a stout, tailless body, a flattened head, and a toothless mouth.

Tozzer and Allen also cite a report by Gordon in 1898 of two whistles with frog representations. I would interpret these to have been used in hallucinogenic context. The role of auditory stimulation in hallucinogenic experience has been relatively neglected, but is of great importance in understanding the guiding of a drug session (see Katz and Dobkin de Rios 1971). In fact, the use of the nonverbal is of paramount importance in bridging two states of consciousness. As various Western psychotherapists have pointed out when discussing the role of hallucinogens in psychotherapy both in European and American clinical settings, access to realms of the unconscious can often cause dire anxiety. Eisner (1967:542) has stressed the vital role of the nonverbal in drug-adjuncted healing sessions.

Other instances of the toad motif can be found in the Madrid Manuscript, which contains representations of tree amphibians known for their loud voices during the rainy season. Tozzer and Allen link the presence of these amphibians to their importance to gods associated with the agricultural season and the sowing of grain at the beginning of the rainy period (p. 310). Schellhas (1904:39) has pointed out that the frog god, pictured with the club-shaped fins of a frog, in the Madrid Codex is shown sowing seed and making furrows with a planting stick.

Landa (1941), writing of festivities during the month of *uo*, the second Maya month, which falls at the height of the rainy season, spoke of a dance at the end of a period of drunkenness called *Okot uil*. Tozzer notes here that the literal translation of this term is "the dance of the moon or month." He also cites Roys's suggestion that *uil* is a contraction of *uol* (*uinal uo*), "of the frogs."

Greene (1967) reports that the Tablet of the Palace in Palenque contains a glyph detail showing the figure of a toad. She states that this represents the Maya month of *uo*. She sees as the principal attribute of the sculpture the poison gland, represented by three circles at the back of its head. She dates this sculpture at about A.D. 645.

An important function for the frog or toad was as the musician and guest of the Chacs, the Yucatec rain gods.

Four in number, the Chacs are found in art representations attended by small amphibians, whose croaking announces rain (Thompson 1954:230). (Morley [1956:190] argues that these four representations are aspects of a single rain deity.) Thompson (1970) reproduces a part of the Madrid Codex in which water pours earthward from the anus of a Chac: the god is surrounded by four frogs or toads, which also spout water. Thompson believes the Chac cult to be limited to Yucatan, where it is probably very old; in the highlands of Guatemala and Chiapas, the gift of rain is seen to be in the hands of the mountain or earth gods (Thompson 1970:251; but see below). Thompson cites the connection between the rain gods and lightning and thunderbolts; according to the *Motul Dictionary*, the Chac was a man of great stature who taught agriculture and whom the Indians held to be the god of bread and water, thunder and lightning, in short, the god of the *milpa*. Since the frog/toad announces rain, the intimate relationship with the god is clear (Thompson 1970:285).

In Tomb I, Mound E-III-3 at Kaminaljuyú, we find an interesting combination of materials connected with the frog/toad and the mushroom motifs. The pottery collection includes a quantity of black/brown fine-incised standard shallow bowls (over 300 specimens) with a quadruped motif (Shook and Kidder 1952:57). In their figure 19 in particular, a pottery vessel in the form of a frog or toad is presented. Cylindrical or goblet-type vessels with similar quadrupedal figures (perhaps used to imbibe a drink containing bufotenine?) were also found. In addition, what the writers have called a "toad bowl" is pictured in figure 35, although the identification of toad is cited as uncertain. Shook and Kidder mention Shepard's identification, however, of the boss on some of the vessels as originating from the poison gland of a common Middle American species of toad. They believe an amphibian, whether toad or frog, to have been the harbinger of rain and venerated by those who equipped Tomb I during the Pre-Classic period. Also included in the tomb's contents were several small toad or frog mortars of gray stone, mushroom stones of coarse-grained lava, and a tripod mushroom stone with a jaguar head. De Borhegyi (1961:499) is convinced that these were burial offerings. Shook and Kidder have written that the richness of the Tomb I finds suggests the burial of a personage of wealth; from the evidence just cited, the individual would appear to have probably been a shaman or priest. (It is interesting that this tomb was robbed, but only partially, shortly after it was laid down. Might the awareness on the part of the grave-robbars of the "powers" of the shaman or priest have been enough to cause a quick withdrawal?) Elsewhere in the same cemetery, a cache of nine mushroom stones was found in association with nine miniature manos and metates; De Borhegyi sees these, too, as burial offerings and wonders (p. 502) whether metates and mortars were used to crush psychotropic mushrooms or *ololiuqui* seeds for ingestion to induce visions. He points to 16th-century Spanish chroniclers' reports (cited in Wasson and Wasson 1957) of hallucinatory dreams of jaguars, gods, and snakes as well as little gnomelike creatures which he thinks may have been gods of the underworld. The presence of *ololiuqui*, which contains LSD-like alkaloids and is used as a substitute for psychotropic mushrooms in Oaxaca, in plant lists from Maya territory has been reported by Schultes (1941), although no cultural activity connected with their presence there has ever showed up in the literature.

Another interesting linkage of a mushroom and toad comes from the contemporary Quiché area, where an unwholesome mushroom is called *holom ixpek*, "toad's head" (Wasson and Wasson 1957:281). This kind of linkage

between the two is widely documented by the authors for Indo-European languages.

In Chalchuapa, El Salvador, in the Middle and Late Pre-Classic periods, Sharer (1968) found toad bowls and sculptures like the Kaminaljuyú finds just cited. In addition, there is a large stone frog/toad effigy (E3M5) in the El Trapiche mound group which is almost certainly Late Pre-Classic in date (Sharer, personal communication).

Other frog/toad representations worthy of notice include the frog altar, in a simple and realistic style, at Izapa (Miles 1965:247). Shook and Kidder mention a frog altar at Kaminaljuyú which they see as a larger version of the toad mortars from Mound E-III-3. At Tonalá, Chiapas, Satterthwaite (1943:131) found a slab roughly shaped and engraved in the form of a frog or toad, measuring 60 × 53 × .15 m. Thompson (1965:347) cites a frog effigy vessel found in a cave near Benque Viejo in the southern Maya lowlands, which may be Tohil plumbate.

Copán Altar A, described by Stromsvik (cited in Rands 1955:362), a stone sculpture representing a grotesque double-headed animal, half serpent, half jaguar, has a toad carving over the end and a rain symbol carved on the stomach. Rands discusses the iconic representation in terms of mythological beliefs connected with this creature, who was seen to represent heavenly forces always engaged in battle. The rain god, the serpent, is most important, but in times of destructive floods, the dry-weather god, the jaguar, must be invoked, (Spinden is cited for the identification of the jaguar as the god of the clear sky, and the serpent as the god of the clouded sky, storm, lightning, rain, and the wet season.) The presence of the toad motif, in my opinion, may be a clue to the use of the hallucinogenic substance by a shaman or priest to call upon the aid of supernatural forces during times of need.

Rands (1953:113) cites the presence, as variants of the *uinal* glyph, of toads wearing water-lily headdresses in the full-figure glyphs of both Stela D and Zoomorph B at Quirigua. Kubler attributes the reptilian form of Zoomorph B to that of a colossal froglike boulder. Its mouth is believed to frame the head and shoulders of a personage similar to earlier portraits of a ruler/priest. Although one may query the toadlike qualities of the sculpture, Greene's rubbing of the Palenque toad cited above is also hardly realistic in its presentation. The association of the *uinal* glyph at Quirigua, however, does substantiate this identification (Kubler 1969).

Once again, we are left at the point where it is clear that the Maya could indeed have used the bufotenine substance from the common *Bufo marinus* toad or similar species in religious activity, but it has not been demonstrated that they did. Mackenzie (n.d.:252) mentions Aztec rites where priests and others enter a lake and swallow live water-snakes and frogs; he says that the goddess Chalchiuhtlicue was sometimes depicted as a frog and that jadeite frogs were favored amulets. Motolinía, in his *Historia de los Indios de la Nueva España* (cited in Braden 1930), mentions that the Indians of the New World had numerous idols, including "frogs and even toads." It is not surprising that the ethnohistorical materials should offer us so few clues as to the use of psychotropic substances. Schultes (1970), among others, has pointed out that native beliefs related to psychotropic drug use evoked only the scorn and distaste of the Spanish and that this resulted in the driving of many psychotropic substances underground.

THE WATER LILY

The common water lily is an aquatic plant of the genus *Nymphaea*. An African representative of this genus, *Nymphaea caerulea* sav., is used as a narcotic among African

groups (W. Emboden, personal communication). Although biochemical identification of the New World variety (*N. ampla*) has not been attempted, it is a generally valid assumption that if psychotropic properties exist in one member of a genus they will probably be found in others. The pharmacologist Farnsworth (personal communication) tells me that the lotus plant, which plays an important part in Asian art and is also a member of the Nymphaeaceae, contains opiate-like alkaloids. Ekholm and Heine-Geldern (cited in Rands 1953) have pointed out the similarity in art representations between Buddhist and Maya art and explained it as due to trans-Pacific contacts; but the botanical data suggests to me that such similarity may be related to the intrinsic properties of the plants in question.

Rands (1953, 1955) lists the following major sites for the water lily motif in Maya areas: Quirigua, Copán, Chichén Itzá, Yaxchilán, Santa Rita, Tulum, Tikal, Palenque, Kaminaljuyú, Bonampak (murals), Usumacinta, Piedras Negras. In addition, the Dresden Codex has numerous representations of the water lily. Most of the dates would appear to fall within the Classic period, although aside from stone monuments, the motif is difficult to date. The only ceramic evidence cited by Rands for water lily motifs comes from Alta Verapaz (1953:88).

Rands describes the mythic associations of the lily as follows: (1) Death symbols are recurrent. (2) Mythic beings occur as the source of the plant and include the long-nosed, serpent, or rain god; a bird form and the jaguar also occur. (3) The anatomical sources found in association with the lily are the top of the head, the ears, eyes, mouth, hands, and perhaps the neck and nose regions. (This is suggestive of the effects that psychotropic substances have upon all sensory modes.) (4) At Palenque, the maize god is found in association with elaborate stems or vines of the lily, which pass through his hand. (5) in the Dresden Codex, the water lily is found in the hand of the long-nosed god. Suggestions of paraphernalia are also found. (This may indicate preparation of the plant either in a drink or in powdered form to facilitate contact with the supernatural.) (6) At Palenque, the lily is associated with one of the nine lords of the underworld. (7) At Copán, the lily is associated with the toad on Stela D and Zoomorph B. (8) Like the lotus in Asian art, the water lily of the Maya is shown with its stem emerging from the figure's mouth and its stalk held in the hands, and reclining human figures are often placed amidst the plants. (If, indeed, both the water lily and the lotus possess narcotic properties, then such visual representations do not appear to be at all strange; one would not have to postulate trans-Pacific contacts to explain them.)

Rands speculates that the Usumacinta region may have been the area in which the water lily motif received its highest elaboration, although no early-period representations of the plant are definitely known. However, from the middle of the Classic period until the beginning of the Mexican period (especially at Chichén Itzá), the water lily motif is very common. Rands sees this motif as part of a complex of beliefs connected with the maize plant and important in Maya religious symbolism.

MAYA RELIGION AND PSYCHOTROPIC DRUG USE

Maya religion is seen to have developed from the shaman level of Proto-Classic times to a level that included a hierarchy of religious officials or priests served by various assistants, such as artisans and craftsmen (Vogt and Ruz 1964). Shamans and priests existed simultaneously among the Classic Maya, each with different and complementary methods of recruitment and training and different and

complementary ritual functions. There were ceremonial centers, which may have been controlled by sets of permanent priests/rulers with inherited positions emerging in fully developed aristocratic lineages. In fact, from Proskouriakoff's work on the Piedras Negras dated monuments (cited in Coe 1966), it appears that much Classic relief sculpture represented dynastic autocrats, their families, and various important events during their reign. These autocrats may have been the ones who carried on various aspects of a hieratic tradition, depending upon the ordinary Maya peasant's labor to produce the important staple, corn. In addition, the peasantry in outlying hamlets would have been in relatively constant contact with ceremonial centers, attending and participating in religious ceremonies and trade.

While the priests who occupied the ceremonial centers were responsible for the operation of centers, ceremonials, and calendars, there were shaman-like *curanderos* at the folk level who probably functioned to diagnose illness and perform curing ceremonies for individuals. They were believed to have derived their power from dreams or other types of vision-like experience. It is important to stress here that in nonliterate societies, hallucinogenic plant-users insist upon the powers ensuing from such plant use (see Chagnon 1969, Aberle 1966, La Barre 1970a, Siskind 1973). I would argue that once such substances were usurped by hieratic functionaries, their use would be strictly controlled and forbidden to local shamans. In a state-level society, power to bewitch attained through drug use would be a threat to "legitimate power," and individual drug-users would be viewed as dangerous. Prior to the Inca consolidation of a sedentary agricultural village-level society, for example, coca appears to have been widely used; the Inca forbade the use of the substance to any but the Inca and his court, and myths were promulgated telling how the gods gave coca to the Inca as the source of his power (Taylor 1966).

It is my opinion that many of the techniques for extracting psychotropic substances from plants or animals probably developed at the folk level (used here in a general sense to deal with pre-Classic periods). If, indeed, as La Barre argues (1970a:76), an incipient narcotic complex existed in Siberia, there may have been a predisposition to utilize mushrooms and similar plants available in the New World. Lévi-Strauss (1970) has shown the distribution of American Indian use of mushrooms outside of Mexico to include California Indians, Salish, Kwakiutl, Menomini, Blackfoot, Omaha, Iroquois, Gé, Mundurucú, Yurimagua, Tukuna, Jicarilla Apache, and the Argentine Toba. (One should note here Wasson's basic distinction between mycophilia and mycophobia; many diverse peoples do not consider mushrooms edible.) Given a predisposition to utilize mushrooms as food in American Indian populations, it is possible to speculate that psychotropic mushrooms may have played an important role in southern Mesoamerican life.

From a pragmatic point of view, mushroom use could be very old; for while many other psychotropic substances must be boiled, pulverized, and specially prepared before their alkaloid properties are released, psychotropic mushrooms can be both used raw and dried and later reconstituted with a bit of water, perhaps entering the hunter's repast more easily than cultivated plants.

A search of Maya ethnographies has failed to bring forth evidence of contemporary use of the toad, except for one reference among the Chorti, who use the frog to symbolically extract disease from a sick person (Reina 1969). It has also been mentioned that mushroom use in contemporary Maya land is nonexistent. If various psychotropic plants and fauna developed and were elaborated at the

folk level, and then subsequently incorporated into hieratic cult use, they may well have gone underground at the time of Mexican incursions into Maya land and the subsequent Spanish conquest, when such practices were systematically eradicated. As pointed out earlier, other psychotropic drugs used in Mexico went into hiding. With regard to toad utilization, in particular, it may very well be that the esoteric knowledge necessary to extract minute quantities of a very poisonous substance disappeared along with the specialized groups who utilized this technique. As with Maya systems of hieroglyphics and calendrics, little has remained recorded, and this has had to be reevaluated in subsequent centuries.

Proskouriakoff (1965:469) and Miles (1965:237) have pointed out that Maya art is an expression of religious beliefs and ritual activities. I shall now examine various aspects of Maya religion, reflected in their art, in the light of the possibility of the use of psychotropic substances.

MAIZE AND THE CHAC

The importance of maize in Maya subsistence and the personification of the rain god, Chac, as a vital force of nature may be connected to the use of psychotropic substances. The Chac occurs 218 times in the three codices (Morley 1956:196) and is seen by Morley and Thompson as one of the most important deities to the Maya farmer. Thompson sees this cult as very ancient, occurring in the monuments of the Classic period and in the Yucatec codices. As has been pointed out, the frog/toad was viewed as the messenger and guest of the Chac. If the Chac did not send rain, might not a priest have imbibed a potion of his messenger's substance in order to enter into more direct communication with the omnipotent forces controlling one's destiny? If we view magical rites as an attempt to control the unknown, then utilization of powerful hallucinogenic substances might make the supernatural more accessible to the priest, whose role it was to oversee the agricultural activities of the populace and utilize his powers for communal well-being.

TIME

Although many early civilizations have had great interest in astronomy, geometry, divination, and other specialized skills that are involved in controlling and predicting agricultural activity, I believe that nonetheless an argument can be made that the Maya focus on the infinity of time can be related to the psychotropic properties of the plants they may have been using. Maya preoccupation with marking passages of time can be related to the psychotropic properties of the plants they may have been using. Maya preoccupation with marking passages of time was quite distinctive—an all-consuming interest, as Thompson has pointed out. All stelae and altars were erected to mark the passage of time and dedicated at the end of a particular period. The eternity of time is a common Maya motif; their concern with time which had no beginning and their interest in past time at the expense of future time (see Thompson 1954:137) is important to consider in light of psychotropic influence. The influence of psychotropic substances on the sense of time has been noted by Ludwig (cited above) and described by Dobkin de Rios (1972a) and Aaronson and Osmond (1970), among others. Early anthropological reports of one hallucinogen, ayahuasca, frequently mention the aerial voyage, the feeling that one is floating in an ephemeral time-space continuum unlike anything known in normal waking hours. These phenome-

na may have convinced the Maya priest that supernatural forces and time itself were cyclical and sacred.

SPIRIT COMPANIONS

The Maya belief in two kinds of souls or spirits possessed by the individual (the so-called *nagual* belief described by Vogt and Ruz 1964:33) is similar to beliefs of other American Indians. La Barre (1970a) cites evidence relating this concept to a Paleo-Indian belief tied in with Mesolithic hunting and gathering economies. This animal-spirit companion is believed to live apart, although it has an intimate relationship to a man or woman. It is also related to ancestral gods. Vogt and Ruz point out that a person's life depends upon the well-being of his animal counterpart. In drug-using groups from Venezuela to Ecuador, it is believed that upon intake of the hallucinogenic substance and by means of incantation or whistling, a shaman can call upon spirit protectors or helpers to effect a cure or to control an enemy or sorcerer attempting evil. Often these creatures are viewed as giants or as small humanoid-like beings, and can probably be related to the physiological phenomena known as macropsia and micropsia (seeing things large or small) which can occur in the wake of drug use.

DUALISM

As in other world religions, there are in Maya beliefs strong dualistic tendencies, e.g., in the eternal struggle between good and evil powers over man, the benevolence and malevolence of the gods, and the conflicting forces within man himself. We can look at the emotional extremes of euphoria and anguish released in man by the use of hallucinogenic substances as a possible predisposing factor in this dualism. An art representation cited earlier at Copán shows this dualism clearly in the struggle between the jaguar and serpent gods. This may be interpreted through the toad motif: use of the toad substance may have been the way in which the magician or sorcerer believed himself able to control unknown forces, either for personal or communal ends. Wasson and Wasson (1957) have argued that hallucinogenic use is a major factor in explaining the world of demons and gods which have entered into man's beliefs throughout the world.

My own ayahuasca experience in Peru made this clear, as the somatic discomfort consequent upon drug intake received visual representation in skeleton-like creatures. Perhaps the thirteen worlds of heaven and the nine worlds of hell and the passage of the gods from one to the other can be related to some of the phenomena experienced by the drug-user. One major aspect of the alteration of visual perception in drug use is that visual images often remain present for a time as new ones are superimposed. This pattern might take on special significance if a shaman were to take his drug surrounded by ritual objects, perhaps giving rise to complex feelings about the transformation of one substance into another. For me, some of the massive Maya sculptures have a "presence" about them that is unpleasantly reminiscent of "bad trip" phenomena (see, in particular, the "toad" framing a human being in Quirigua). In this connection, one might cite again Rands's association of the water lily motif with death, or else, following Ludwig, the commonly reported feeling of death and rebirth among drug-users.

I would argue, however, that association of demonic-type representations in drug experience with Maya gods of the underworld does not in any way mean that we should attribute a "bad trip" to the drug-using priest. Rather, cultural patterning of visual drug experience consistently gives rise to hallucinogenic content which has cultural

tuition (see Dobkin de Rios 1972b). If beliefs exist concerning demon-like gods, a drug-using priest may indeed find himself in contact with a series of forces (both within himself, and valued by his culture) which he may attempt to control, or he may see himself as a mouthpiece of the gods of the underworld. In most drug-using cultures prior to Western contact, the notion of a calling is acknowledged generally for the shaman or priest. In those drug-using societies where adequate data exists, one finds that it is generally recognized that the shaman is a special individual whose nervous system and level of maturity permit him to deal most competently with the realms of unconscious activity generated by hallucinogenic plant use.

DIVINATION

Thompson (1970:185), commenting on the *Chilan Balam*, has described a Yucatec ritual in which the Chilan (a special individual who made prophesies after consulting a divinatory almanac) retired to his house and entered a trance in which he received messages from a god. Thompson believes that the Chilan's visions were induced by a narcotic, but he is not sure what drug may have been involved. It is possible that an infusion of the water lily or the toad was used to enable entry into a state in which one believes that one serves as a mouthpiece for the gods. The use of hallucinogens for divinatory purposes would not have been unusual, considering its widespread interest for many primitive populations among whom powerful mind-altering plants are put to similar work (see Friedberg 1965, Cooper 1952).

CONCLUSION

This paper has attempted to show the influence on Maya religious beliefs and practices of three psychotropic substances represented in ancient Maya art. It is hoped that competent Maya specialists will be able to pick up the threads of the various arguments and shed further light on the role of psychotropic flora and fauna in Maya religion.

Abstract

An examination of Maya art from southern Mesoamerica shows the following art motifs appearing with some regularity throughout the archaeological record, from Pre-Classic to Post-Conquest times: (a) mushroom stones and mushroom pottery, (b) the frog/toad motif, and (c) the water lily motif. The thesis of this paper is that these flora and fauna represented in art are related to and influenced by the psychotropic properties of the mushroom, toad, and water lily. It is hypothesized that such properties were known to the Maya shaman, priest, and artist as well as being generally diffused at a folk level in Pre-Classic times. The paper examines certain Maya religious beliefs and practices believed to be influenced by and possibly derived from such psychotropic use.

Comments

by NORMAN ALGER

Moorpark, Calif., U.S.A. 16 XI 73

It is well documented that the Spanish suppressed the use of psychotropic drugs in Mesoamerica because they identified it with the aboriginal religions they were trying to replace with Christianity. They only succeeded in driving

much of such drug use underground. That the use of some other drugs may have been driven underground before the Spanish conquest is suggested by the attempts of Moctezuma II to discourage *pulque* consumption among the Aztecs. It remains the task of interested specialists to reconstruct such possible drug use through the use of archeological and ethnohistorical evidence.

Dobkin de Rios has made a good step in this direction in her attempts to show that psychotropic mushrooms may have been used in Maya religion. She presents a good case for this point of view.

Her thesis that the frog/toad was used by the Maya as a psychotropic agent rests on much shakier ground. Unless it can be clearly shown that bufotenine, or some other substance in the frog/toad, really has psychotropic activity, it is difficult to take this claim seriously. Schultes and Hofmann (1973:90), discussing hallucinogenic snuffs, state that "it seems probable . . . that 5-OH-DMT [bufotenine] does not contribute to the psychotomimetic activity of the snuffs." They base this judgment on two reports in which no hallucinogenic activity at all was found, even with higher doses. Furthermore, even if it could be shown that bufotenine has psychotropic properties, this would not prove that frog/toad poison was ingested for such properties. I know of no case in which native peoples have been able to separate the various pharmacologically active principles in a specific natural product from each other in pure form. To do so requires a sophisticated knowledge of chemistry and differential solubilities. Opium contains at least 17 alkaloids, plus other substances. It has been used by man for centuries, and yet none of the alkaloids had been isolated until morphine was isolated by the German pharmacist Sertürner in 1803 (Jaffe 1965:247). Therefore we must look at the whole drug rather than one of its many constituents. Toad poisons contain a number of chemicals in addition to bufotenine. These include substances closely related in chemical structure and pharmacological activity to digitoxin, a potent cardiac glycoside (Sollman 1948:476). There exists the strong possibility that the individual ingesting toad poison would die of cardiac failure before he could enjoy the benefits of any putative bufotenine hallucination. This would obviously place severe restrictions on the use of toad poison as a psychotropic agent in religious practices. Further pharmacological studies of toad poison are needed before we can safely state that it could have been used as a psychotropic agent.

Many of the foregoing remarks could also be applied to the putative use of the water lily as a psychotropic agent by the Maya. Phytochemical and pharmacological studies of *Nymphaea ampla* will have to be made before a clear case for such use can be made. Although Dobkin de Rios states that there are no such studies, there is a reference in Sollman (1948:212) to an article which states that *Nymphaea* (unfortunately no species designation is given) contains alkaloids that produce "various degrees of narcotic plastic rigidity, or at least tendency to maintain abnormal postures." It might prove worthwhile to consult the article cited to see if the author had uncovered any evidence of psychotropic activity.

As an anthropologist, I feel that Dobkin de Rios has done us a service by providing a model for future investigation of what may prove to be an important area of research. However, as a pharmacist, I feel that studies of drugs cannot overlook the evidence and knowledge of pharmacognosy and pharmacology.

by N. ROSS CRUMRINE

Victoria, Canada. 7 XI 73

In general, and in terms of my recent field research among the Mayos of Sonora, I find this article fascinating but

in many places not entirely convincing. Certainly, the latter problem relates to the availability of materials, and Dobkin de Rios is very careful in stating that many of the relationships she suggests are possibilities rather than established fact.

Though the Mayos are distant from the Maya area, data on them proves important at a more general level. A Mayo smoking-curer prays and chants, smokes native tobacco, and blows the smoke on the patient, and while everyone present smokes commercial cigarettes he sings the songs of the various saints and hears them make curing recommendations as though they were "speaking to me over a telephone." In other contexts he also uses massage and herbal medicines and may retrieve a cactus spine wound in cord that is the cause of the illness. To the best of my knowledge, no psychotropic substance other than tobacco is used. Paralleling Dobkin de Rios's suggestions, Mayos see tobacco smoke as living and as containing curative powers, but many Mayo medicines, such as ocean water, as well as the saints in the churches are spoken of as living. Native tobacco is popular among members of the new revitalization movement I saw develop, although it rejects other psychotropic substances, even alcohol. Beyond coffee, alcohol, and tobacco, I know of no psychotropic substance that is popular among Mayos.

Dobkin de Rios's suggestion that the archaeological manifestations of mushroom, frog/toad, and water lily are possible indicators of hallucinogen use is interesting. Certainly there is archaeological as well as good supplementary ethnographic evidence for the use of hallucinogenic mushrooms in southern Mexico. The published sources seem to indicate that the use of mushrooms parallels the use of Mayo tobacco and of ayahuasca in Dobkin de Rios's and others' accounts; that is, they are used by a shaman-curer in a ritual context oriented around curing. This suggests that shaman-curiers and not priests tended to use hallucinogens, and for rather specific purposes, although I realize that hallucinogen use is somewhat different among isolated jungle tribes. The Mayo data are interesting in this regard. As the revitalization movement was being established, a number of Mayos in a church saw God and the saints. The only individual present who sadly admitted not having seen the saints was the young maestro (a lay minister who prays at community rituals and does not smoke or cure). He explained that his books and prayers were his kind of revelation. Thus the supernatural experience appears to be more meaningful within a curing or a small cult context than within an established church or religious tradition.

The frog/toad and the water lily motifs are more difficult to evaluate, as we have no ethnographic evidence of their use as hallucinogens in Middle America. Certainly both are closely related to water and thus to rain and fertility. This might be a more obvious explanation for their appearance in Middle American art styles than Dobkin de Rios's suggestion. As Victor Turner and others have pointed out, symbols, especially ritual symbols, incorporate a range or "fan" of meanings. Thus these motifs might have referred to a complex "fan" including rain, water, fertility, and hallucinogenic powers. I think Dobkin de Rios is quite right that this would be a more satisfactory explanation of the multiple existence of the lily motif than trans-Pacific contacts.

Dobkin de Rios's suggestions concerning the Maya concepts of time, spirit companions, and dualism require, it seems to me, a somewhat broader perspective. Her suggestion that the Chilan may have been using an infusion of the water lily or the toad to aid his entry into liminality

or the sacred state beyond everyday reality is worthy of consideration. He may, however, have been using a native tobacco like the Mayo curer-diviner or perhaps no hallucinogen at all. While hallucinogens may be used to produce a state of liminality or special kind of creativity, other physiological or symbolic processes may also produce this effect. In the case of the Mayo revitalization movement, no hallucinogens were involved. Over several weeks, community excitement increased until certain events triggered the entrance into a liminal state. Certain types of cognitive dissonance and perhaps even the "bad trip" Mayan art objects mentioned by Dobkin de Rios may be other means of entering liminality and achieving certain types of ritual learning and creativity. In my opinion, the major contribution of Dobkin de Rios's article is the attempt to delineate one of the means the Classic Maya may have utilized to tap the realm, potentially so rich and powerful, that lies beyond everyday experience.

by PETER T. FURST

Albany, N.Y., U.S.A. 1 XI 73

The kind of analysis Dobkin de Rios attempts presupposes considerable familiarity with the ethnohistorical and recent literature and the ethnographic situation, as well as with cosmology and the complex iconography of pre-Hispanic art. Where this essential precondition is lacking, as it seems to be in this case, specialists unconvinced of the validity or importance of this focus can all too easily take advantage of unsupported claims or erroneous interpretations of the evidence to discredit the whole field of research. Thompson (1970:185) is undoubtedly right that, notwithstanding the silence of the colonial sources on hallucinogenic plants among the lowland Maya, in view of their widespread use elsewhere in Mesoamerica they were probably known to the Maya. Dobkin de Rios argues that the Maya used mushrooms, toads, and the water lily and that it is their biochemical properties and psychotomimetic effects that account for their widespread use as art motifs. That this applies to mushrooms is hardly to be doubted, but problems arise in relation to the toad and the water lily. The toad motif extends to realms far beyond biochemistry, while for the water lily no scientific evidence exists that it has any psychotomimetic or hallucinogenic constituents and no ethnohistorical or ethnographic data suggest that it was ever used by the Maya.

Since the water lily has never been tested for alkaloids, one wonders whether it would not have been wiser to submit a specimen to a laboratory, before jumping into print with claims that it was used hallucinogenically. Indeed, considering Thompson's lengthy discussion (1970:103–23) of the use of tobacco for divinatory, intoxicating, purifying, and other ritual purposes among the Maya, the many representations of tobacco and smoking in Maya art, and what we know from other sources (e.g., Wilbert 1972) of the use of tobacco as a shamanic psychotomimetic, one wonders why Dobkin de Rios chose to tie her case to the untested water lily rather than to *Nicotiana*.

As for the possible use of toad poison, one can only welcome the fact that this interesting problem is being subjected to increasing debate in the anthropological literature. Contrary to the author's belief that no one has heretofore attempted to link frog-toad symbolism to the biochemical data, Roth (1915) and Wassén (1934:esp. 617–23, 625) long ago devoted themselves to this problem. The 17th-century English friar Thomas Gage described the Pokomam Maya practice of steeping venomous toads in fermented beverages used for ritual intoxication, to give them extra potency (Thompson 1958:225). Coe (1971) has

discussed a possible ancient hallucinogenic use for toads in relation to his discovery of large quantities of *Bufo marinus* remains at the Olmec site of San Lorenzo; it was my suggestion that such use might have resembled that of Gage's Pokomam or the present-day Quiché Maya (Schultes 1972a:28 n). Gertrude Dole and Robert Carneiro have recorded Amahuaca (Peru) magical practices in which frog or toad poison is introduced into self-inflicted skin burns to bring about a trance state in which hunters feel themselves to be in contact with the spirits of animals and the forest (Carneiro 1970:331–41). I have suggested a possible relationship between bufotenine and the widespread Hero Twin and Toad-Jaguar Grandmother myth complex (Furst 1968) and discussed the toad as Earth Mother in Meso- and South America and the possible (but not necessarily causal) relationship of this phenomenon to the biochemistry of *Bufo marinus* and its relatives (Furst 1972a). It is presumably the conceptualization of the Earth Mother goddess as a devouring-regenerative monstrous toad with jaguar characteristics that accounts for the monolithic toadlike Zoomorph B at Quiriguá, Altar A at Copán, and the toad altar at Izapa, as it does for the "earth monster" *yugos* and the Tlaltecuhltli images on so many Aztec monuments. Hence we need not seek explanations for this motif in the use of a toad hallucinogen by a shaman or priest. This is not to say that no Maya or other Mesoamerican shaman used such a substance; in fact, there are small Maya bowls representing toads with prominent parotid glands that could have been used to hold the exudate of these venomous creatures. Supporting this possibility is a verbatim transcript of a taped interview by Timothy Knab with a *curandero* from Veracruz describing precisely how a "*brujo*" treats the venom extracted from *Bufo* to eliminate or neutralize its more dangerous toxic effects when preparing his magic potion.

A word about mushrooms is also in order. As Robertson (1972) discovered, use of hallucinogenic mushrooms is not extinct among the Maya (the Lacandon employ *Stropharia cubensis* in some of their rituals). While the Lacandon evidence could not have been known to Dobkin de Rios when she prepared her paper, the model she constructs to account for the general disappearance of the prehistoric mushroom "cult" among the Maya is open to serious reservations on methodological grounds. There is no evidence for a "usurpation" of any of the hallucinogens employed in Mesoamerica by a priestly elite. On the contrary, all the available evidence suggests that botanical hallucinogens, from morning-glory seeds to mushrooms to tobacco, etc., were employed by practitioners of the sacred on every level of society. Not even the police power of the modern state has been able to stop widespread recourse to forbidden substances; how much less likely that, even had they been so inclined, the Maya elite sitting in their ceremonial centers surrounded by dense tropical rain forests could have stopped a distant village or family shaman from following his time-honored sacred traditions. Even the analogy to coca in Inca times is methodologically invalid. Andeanists doubt that the Inca in fact exercised as much control over coca use as has been claimed (William Isbell and Billie Jean Isbell, personal communication). Furthermore, mushrooms and coca are not comparable, since coca is not a hallucinogen. Finally, several true hallucinogens, not the least of them *vilca* (*Anadenanthera colubrina*), apparently were freely and widely employed.

Anthropologists already lag far behind the ethnobotanists and pharmacologists in the significant field to which this paper is intended to make a major contribution. Unless all of us—and I am not exempting myself—learn to apply far more scientific rigor in our research, we are not likely to catch up very soon.

Long Beach, Calif., U.S.A. 14 XI 73

Dobkin de Rios's thought-provoking hypotheses appear at a time of intense interest in psychedelic anthropology (see, e.g., Furst 1972*b*). I will address specific points she has made and then add observations from my own research.

1. In referring to "three major [Maya] regions of southern Mesoamerica" without citing a source, I assume the author is following Coe's (1966) classification of Southern, Central, and Northern areas; this should be clarified for readers unfamiliar with Maya prehistory. Actually, the mention is not necessary, since there is no further reference to them even where it might be useful (e.g., to locate geographically the three codices that have numerous representations of Chac).

2. I do not know to what extent Mesoamerican archaeologists agree with De Borhegyi's interpretation of the "mushroom stones." Photographs or diagrams should be included in an article on art motifs. The sole artifact photograph I have seen (Furst 1972*b*:189) looks convincingly like a mushroom.

3. Widespread use of coca in the Andes before limitation of its use to the Inca nobility is documented, and I agree with Dobkin that the same process involving psychotropic drugs may have occurred in the Maya area with the development of states. However, the chewing of coca became widespread again in the Andes after the Inca Empire fell (Steward and Faron 1959:142). We should look for reasons why the Maya did not eventually resume use of psychotropic drugs.

4. The notion, borrowed from La Barre, that pre-Columbian immigrants from Asia had a predisposition to utilize mushrooms ritually is fascinating. However, thousands of miles and centuries of travel separated prehistoric Siberia from southeastern Mesoamerica, and the idea that such a predisposition was retained must be considered highly speculative.

5. Two students of archaeologist Coe have reported ritual consumption of mushrooms among present-day Chol Maya (Furst 1972*b*:x). This new evidence fills a gap that prevented Dobkin from citing even one contemporary Maya group that uses psychotropic plants.

6. The statement on spirit companions needs clarification. Animal-spirit companions are the focus of Dobkin's concern. Some contemporary Maya believe that every member of the society has an animal-spirit companion or animal counterpart. This phenomenon is found also in parts of South America. An entirely different concept found in some Maya groups is the belief that certain individuals transform themselves into creatures that go about at night and do harm to people. This concept of animal transformation is limited to Mesoamerica.

In the hamlet of Yochib, municipio of Oxchuc, Chiapas, Mexico, I have found that local-grown tobacco is chewed by men, much as coca is in the Andes, to provide warmth on cold days. Tobacco is also applied to patients' bodies during certain curing rituals, while the healer vocally offers it as a gift to supernatural beings in return for a lost soul. During witchcraft curing rites, shamans drink large quantities of rum to gain sufficient courage to confront spiritually, and sometimes empirically, the owner of an animal transformation that is harming the victim's soul. It is even possible that rum is now a functional equivalent for pre-Columbian tobacco, which was used as a psychotropic plant in various parts of the New World (cf. Janiger and Dobkin de Rios 1973).

In general, the author's arguments are intriguing, and while they raise more questions than they answer this is her explicit intent.

by NICHOLAS M. HELLMUTH

Guatemala City, Guatemala. 13 XI 73

Dobkin de Rios provides a needed kick to conservative Maya scholars, most of whom still view the ancient Maya as calm, benign people as described by early Carnegie Institution of Washington writers. Sylvanus Morley would be shocked to learn that his Maya may have taken drugs. Dobkin de Rios provides a useful view of the Maya from the viewpoint of one admittedly not a Maya specialist. She calls for "competent Maya specialists" to investigate further her suggestions, a call I hope is heeded.

Dobkin de Rios's paper is flawed by its quotations of old-fashioned hypotheses which have been superseded by new ones, for example, "all stelae and altars were erected to mark the passage of time and dedicated at the end of a particular period." The ancient Maya did not necessarily worship time with all the gusto ascribed to them by J. Eric S. Thompson. Such a one-sided idea has given way to a more realistic understanding of the largely historical nature of Maya inscriptions as demonstrated by Proskouriakoff and Kelley. Dobkin de Rios's assertion that "Maya focus on the infinity of time can be related to the psychotropic properties of the plants they may have been using" is not likely to impress many Mayanists. The Classic Maya of the Petén probably inherited the basic hieroglyphic and stela cult from Kaminaljuyu and Izapa and before that possibly from an Olmec-influenced region, so the author needs to find mushrooms everywhere to cover each possible region of origin.

Another flaw is the lack of evident understanding of the major differences between the Maya lowlands and the Maya highlands and among the various regions within each. Whereas psychotropic drugs may have been used in the central highlands of Guatemala, little evidence is available for the lowlands. An exception may be in the lowland Palenque region, where young visitors are making delightful use of a potent local mushroom. A paucity of factual botanical and zoological information is coupled with unconvincing statements on the iconographic representation of the use of mushrooms or frog/toads. The absence of illustrations is a serious deficiency.

The section on the frog/toad is particularly lacking in zoological information. I have lived in the Petén for more than 24 months and would have welcomed biochemical data on the frogs/toads of this region which I see daily. For example, do all toads carry bufotenine? With the frog/toad the author blithely skips regions, first speaking of Maya Yucatan, then of Palenque, then of the highlands. Richard Rose tells me of the use of a frog/toad rubbed on the human skin to produce a reaction; his recent fieldwork in the Guatemalan highlands was focused precisely on Maya use of psychotropic flora and fauna.

Dobkin de Rios's suggestions will remain unconvincing until detailed documentation can be found either in artistic representations or, more likely, in historical ethnographic records. The author explains away the lack of ethnohistorical mention of psychotropic flora and fauna by suggesting these practices had been driven underground. My perusal of about 5,000 folios of unpublished manuscripts on the Maya in the archives of Spain and Guatemala would lead me to dispute her claim. In fact, the Spanish took special delight in ferreting out the most diabolical and distasteful actions of the Maya as a justification for the wholesale slaughter, forced conversion, and forced resettlement of the "heathens." The author would do well to consult such historical-ethnographic specialists as Scholes, Feldman, and Calneck to see whether they have any information bearing

on this matter. References in documents on the 16th- and 17th-century Cholti Lacandon to diabolical screams and speaking of the devil might indicate the use of some psychic stimulation, but probably not. Actually, the priest had probably imbibed lots of the potent Maya beer. The Maya propensity for beerlike drinks is known historically and ethnographically. Also, what about the common drug nicotine? From the archives I have a fascinating description of 17th-century Cholti Lacandon use of tobacco—regrettably still unpublished.

Today in the Central Market of Guatemala City native women sell all kinds of modern frog-shaped ceramic artifacts (Bianca Iovine, personal communication). Do these little old ladies secretly imbibe mind-expanding doses of toad-juice cocktail under their counters? Does the portrayal of mushrooms and toads in ancient art prove the ingestion of these substances by the ancient Maya?

The suggestion that art historians view massive Maya sculptures as having “a ‘presence’ about them that is unpleasantly reminiscent of ‘bad trip’ phenomena” makes me first wish to chortle. But really, should the art historian limit himself to neat “scientific” explanations tailored to our Western way of thinking? Anthropology’s wide-open view of the diversity of mankind’s ways should instead allow us to look more closely at some possibly useful insights from Dobkin de Rios’s paper, hard as they may be for conservatives to swallow. I would hope, though, that in the future she would co-author her papers with a zoologist, a botanist, an archaeologist, and an art historian so that errors in these fields will not detract from her otherwise useful contributions.

by NICHOLAS A. HOPKINS

México, D.F., Mexico. 8 xi 73

Dobkin de Rios’s paper raises again (cf. Lowy 1971) some interesting questions, but cannot resolve them for lack of the right kinds of data. Much of the right data is now becoming available as increasing numbers of ethnographers and botanists take an interest in hallucinogens; Furst (1972*b*) and Harner (1973) hail the renewal of anthropological studies, while botanists (e.g., Schultes and Hofmann 1973) continue to document their occurrence and use where ethnographers have feared to tread.

The psychotropic mushroom *Amanita muscaria* has now been reported from highland Guatemala by B. Lowy in a recent article in *Mycologia*. Breedlove and Hopkins (1970, 1971*a, b*) reported 17 Chuj names for (unidentified) mushrooms, including one I now suspect to be *A. muscaria* on the basis of the informant’s description and the Chuj name for the mushroom, *how k’an xuh*. The plant name *k’an xuh* ‘yellow gourd’ refers to an edible mushroom (Breedlove and Hopkins 1970:289). The plant name *how k’an xuh* ‘angry, mean, or poisonous *k’an xuh*’ marks this particular mushroom as toxic in some sense (Breedlove and Hopkins 1970:287). The same adjective appears in the plant name *how čočol*, *Rigidella immaculata* Herbert or *R. orithantha* Lamarck, “a plant resembling the *čočol*, but poisonous” (Breedlove and Hopkins 1970:287); *čočol* is *Tigridia pavonia* DeCandolle (Breedlove and Hopkins 1970:285). My notes indicate that *how k’an xuh* was described as a red-topped mushroom which grows among pines. Thus there is some reason to suspect it to be *Amanita muscaria*.

Other plants reported to be used elsewhere for their psychotropic qualities (Schultes 1972*a*) also occur in the Chuj area: (1) *Datura candida*, Chuj *šutit* (Breedlove and Hopkins 1971*b*:193), which may be of some interest, since Schultes (1972*a*:47) lists *D. candida* among *Daturas* which are “native to the Andean highlands . . . [and] appear to be chromosomally aberrant cultigens unknown as wild

plants.” (2) *Erythrina berteroa* and *E. macrophylla*, Chuj *ʔukun* (Breedlove and Hopkins 1971*a*:115), the beans of which are used in divination. Schultes (1972*a*:51) says of *Erythrina* that it is “the legendary divinatory *tsité* tree of the Popol Vuh; its beans were also employed in the ritual *patolli* game of central Mexico. Some species of *Erythrina* contain indole or isoquinoline derivatives, but their possible use as a narcotic is not well known.” (3) *Coriaria thymifolia*, Chuj *nayipʔ* (Breedlove and Hopkins 1971*a*:127), which Schultes (1972*a*:52) reports as being used in Ecuador for hallucinogenic effects.

Thus, the potential for use of psychotropic flora (and fauna, in the case of the toad) certainly exists in parts of the Mayan area. But this hardly forces upon us the necessity to accept that the Classic Maya used hallucinogens. I am not opposed to believing that they did, but I do not believe Dobkin de Rios has provided enough evidence to prove the case. Given the paucity of ethnographic evidence which can be brought to bear, this is hardly surprising—regardless of the truth of the matter.

One line of evidence which could help resolve the questions dealing with the mushrooms is linguistic evidence, long unexploited to any great extent by Mesoamerican prehistorians. Phonological research in Mayan has now gone far enough for us to be able to do floral, faunal, and cultural reconstructions on the order of Friedrich’s *Proto-Indo-European Trees* (1970) in whatever domain we have documented sufficiently in the modern languages. All we need to be able to generate strong hypotheses about the age and nature of Mayan mushroom use are systematic collections of fungal terminologies in selected Mayan languages. The data are not impossible to collect; the mushrooms are there, and the modern Mayans know about many of them and have names for them. A systematic study of a few Mayan groups would make obsolete the sketchy colonial records, brief ethnographic mentions, and notes by wandering mycologists that now pass for hard data and might move us out of the present era of broad speculation.

by WILLIAM CLYDE KING

Pittsburgh, Pa., U.S.A. 15 xi 73

It is possible that the deductions present in this article are erroneous, but I doubt it. Allegro (1970) has made similar deductions about the cults in the Middle East around the time of Jesus (he even goes so far as to suggest that “Jesus” was a code word for the mushrooms). Wasson (1968) has made similar arguments about the role of mushrooms in the formation of the Vedic traditions of India. The farther we look, the more evidence we find that the origins of religion and/or religions were linked to the use of psychedelics.

One point that Dobkin de Rios does not pursue far enough is that as political centralization took place, the use of the drugs was suppressed: they became a threat to “legitimate power.” The similarity to our own situation seems obvious. The biochemical power structure in our society (the American Medical Association, the U.S. Food and Drug Administration, etc.) perceives these chemicals not as dangerous to users, but as a threat to their monopolistic control over the dispensation and use of these and other chemicals.

I must quarrel with one of the author’s implicit ideas—that the drugs are responsible for the “religious” phenomena under discussion. Many people in many different cultures have experimented with a wide variety of psychedelic substances. These different chemicals produce very different kinds of experiences for the user. They are similar only in that they all produce experiences which are different

from "normal" experience. Perhaps what happens is that human beings, when faced with nonordinary realities (whether chemically or otherwise induced), respond in terms of the ultimate questions we all share as members of the species.

by JOAN D. KOSS

Rio Piedras, Puerto Rico. 20 xi 73

I found this an admirable attempt to "read into" the archeological record to supply another piece in the still incomplete puzzle picture of an important prehistoric society. I shall only offer some perspectives that might elaborate upon and bolster some of the author's pioneering inquiries.

Although admittedly speculative, it might be productive to consider the motifs representing psychotropic substances as symbols of trance experiences instead of (or as well as) trance inducers. The absence of the widespread use of the materials themselves just prior to and during historic periods does not necessarily exclude the possible great importance of trance to Maya rituals, since trance states basically similar in patterning may be induced by a number of "natural" means such as sleep deprivation or even simple concentration once the technique is learned. As Dobkin suggests, psychotropic drug use may have developed in shamanic practice prior to Classic times. Trance states and patterned responses originally developed through drug use could then have passed to the priests as their ritual prerogative. Thus the toad, mushroom, and water lily motifs may depict messenger gods as intermediaries between priests and major divinities, symbolic rather than representative of the chemo-paths used in earlier times.

By taking this line of thought, it is interesting to consider the pictorial contexts in which these motifs appear. The lily, for example, though frequently associated with orifices of the head (mouth, eyes, ears), may or may not have been ingested. These associations may instead indicate its effectiveness as an entry-way into the body of the priest, who in his turn symbolizes the body politic (Douglas 1966:127-28). My assumption here is that the art forms represent viable symbols also expressed in ritual. There is no mention of the depiction of a ritual similar to, for example, the mural at Cholula, Puebla, where human figures are shown apparently preparing and offering libations. The Cholula scene is richly punctuated with designs strikingly similar to the peyote button.

Another consideration, also speculative, might be introduced. Douglas (1969:74) associates religious "ritualism" with societies of highly articulated social structure and "effervescence" with those where articulation is weak or even lacking. Classic Maya society perfectly fits her description of a situation in which we might expect a religion of control. In this type of religious order, trance would be highly stylized and limited to selected persons (as Dobkin suggests). There would be great emphasis on control of consciousness rather than on spontaneous ecstatic expression in ritual. Wallace (1950:21), analyzing projective elements in the Mayan codices, has described the Maya priest as dependent upon "careful control of his behavior in a formal sense" (p.21). The preoccupation with oral and phallic rituals he notes matches that aspect of the "ritualized" religious order that focuses on "symbolic distinctions between inside and outside," body orifices, and social differentiation (Douglas 1969:74). This kind of religion would appear well-suited to the kind of personality Wallace describes as relating poorly to others on an emotional basis and rigidly suppressing aggressive impulses within a rather tenuous social façade. If this were true and priests did "trip" on psychotropes to gain release of antisocial impulses

within socially approved ritual contexts, this might explain the "bad trip" aspects of some Mayan art experienced by the author.

Summarizing, I would suggest that if trance states and "effervescence" once characterized Mayan religion, it may have evolved into a religion of "ritualism" by Classic times, with trance states much rarer but retaining important symbolic value. I must hasten to add that this is merely an analytic exercise among many that could emerge given interesting new approaches to existing materials such as that presented here.

by WESTON LA BARRE

Durham, N.C., U.S.A. 25 x 73

Dobkin de Rios has given us an interesting and useful paper. Although her term *Piptadenia peregrina* is standard in the literature, it may be useful here to note that botanists have remonographed this genus, the proper term for which is now *Anadenanthera*. This narcotic snuff, cohoba, is the first Amerindian hallucinogen known to Europeans, being mentioned in a letter by Columbus quoted in the biography by his son. Though discovered in the Caribbean, it is of course used in Amazonia as well.

This may be occasion to alert scholars to watch for ethnographic and other data concerning the archeologically oldest-known hallucinogen in the New World, *Ungnadia speciosa*, the Texas buckeye, C¹⁴-dated at 10,000 B.P. from western Texan and northeastern Mexican sites (Adovasio and Fry 1972). The high toxicity of *U. speciosa* has led some botanists to doubt its use as a hallucinogen; but there are no rivers in the region suitable for its use as a fish poison, and stores of *U. speciosa* have been found in the same type of woven-closed basket in the same caves where, on later levels, the ritually known hallucinogen *Sophora secundiflora* (the also quite toxic red bean) was found stored. Indeed, beans and buckeyes are found mixed in the same basket in at least one site, Horseshoe Cave. The red bean, of course, is known ethnographically from Cabeza de Vaca's mention in 1539 for the trans-Pecos region, and since Campbell (1958) there can be no question of its archeological antiquity. Further, the quantities of *Ungnadia* found stratigraphically decrease as those of *Sophora* increase, with only feebly toxic peyote not here found and evidently later than both—leading to the conjecture that the use of older and highly toxic hallucinogens is driven out by later-discovered and less toxic ones. The position in this time sequence of the gentle but firm psilocybin-containing mushrooms is known from contact-period ethnography but scarcely from earlier-datable actual archeological finds; and in this connection the Guatemalan mushroom stones of De Borhegyi (1961, 1963, 1965) mentioned by Dobkin de Rios assume special significance.

The use of sage (*Artemisia* spp.) is not, as our author seems to imply, unique to Navaho, but generic in Plains peyotism. And the hallucinogenic relevance of bufotenin-containing toadskins has been repeatedly noted (Wasson 1957; La Barre 1970b:146; and others). But the careful collations by Dobkin de Rios from Middle American art are impressive and convincing. Most valuable of all are her conjectures on water-lily motifs in Mayan art, conjectures both thoroughly viable and heuristically exciting. At the same time, scholars can only commend her sagacity and circumspection in stating that lotus/water lily parallels require no postulated trans-Pacific (or for that matter, trans-Atlantic) contacts with the Old World.

I find psychologically most absorbing her animadversion to Thompson's remark on Mayan time preoccupation, the

"eternity of time" phenomenon, and the time distortion and timelessness associated with the use of many psychotropics such as *Cannabis*, *Banisteriopsis*, psilocybin, and others. This "floating in an ephemeral space-time continuum" of cyclical sacred time is the same phenomenon referred to by Eliade concerning native identification of present-ritual and ritual-origin time as *in illo tempore*, by Freud as the timelessness and eternal presence of the unconscious, and by Australian Aborigines as *alcheringa* time. And ayahuasca and witches' toadskins are not the only psychotropics that give rise to shamanic flying dreams and visions (La Barre 1970b:185-86, 195), bird familiars (*vide sub* Birds, Bird shaman), and shamanic singing to supernaturals (*v.s.* Music). The preternatural experience of time is evidently a cross-culturally valid pharmacodynamic and psychological phenomenon. If psychotropic- and dream-flying are similarly panhuman psychologically, then we can have insights into not only Mayan and Amerindian but also, I believe, Old Stone Age art.

by HERBERT J. LANDAR

Los Angeles, Calif., U.S.A. 8 xi 73

Dobkin de Rios echoes the position of Goodman (1897) that the same Mayan symbol meant the same thing to all Mayan people at the same time. The vulnerability of this assumption of homogeneity, however, is underscored by the separation of Mayan tribes perhaps thousands of years ago. Each tribe is a group for separate ethnographic study. Diversity of religious practices is the rule, and there are differences, for example, of calendrical and ritual procedure not only from tribe to tribe but also within tribes.

Unproved and perhaps unprovable assumptions should not, however, distract us from investigating suggestions of interest. Among the former I notice the assumptions that (1) the Maya had a world view, (2) this was influenced by drugs, and (3) what the priests knew was public or folk knowledge. The conclusion about a world view begs the question by presenting an opinion without supporting evidence. The inference of a Mesoamerican drug culture par excellence, in which parents taught their children to associate trances and visions with water lilies, mushrooms, and toads, is not supported by contemporary ethnographies, which indicate that drugs are the esoteric property of sorcerers and carefully selected apprentices. Why did Wasson and Wasson (1957) make their work so difficult to get? Because their sources did not want publicity about the mushroom cult. But for their promise to keep secrets, the Wassons would have had a two-volume paperback best-seller.

I prefer the approach of Thompson (1970), who keeps his Mayan tribes apart and who shows that to characterize Mayan religious life is a complex problem for which simplistic solutions are inadequate. Dobkin de Rios has done us a service in giving us questions to ask informants about possibly narcotic or intoxicating plants and animals. But we cannot ever free ourselves of facts which she glosses over, for example: (1) water lilies symbolize creation for the Lacandonese and the vegetative earth for Yucatec users of the signs Imix and Akbal (Thompson 1970:202, 220), and (2) the lore and rituals of the black-and-orange *u*o frog, *Rhynophrynus dorsalis*, in Yucatec rain making involve no public imbibing of toad extract (Thompson 1970:258).

by JOSEPH K. LONG

Dallas, Tex., U.S.A. 7 xi 73

Appropriately, this article's germinal concepts serve to raise many more questions than are answered. I emphasize here some which seem crucial:

1. What are the *demonstrable* effects of hallucinogens on graphic art? Effects of LSD on art have been observed, but among many groups in which use of hallucinogens is common graphic art is virtually absent.

2. What are the interrelationships of religious practices, use of hallucinogens, and symbols in culture change and diffusion? Mushrooms, toads, and water lilies are certainly common in the southeastern United States. Yet, although frog symbolism is frequent in the Mississippian culture which spread there from Mexico, mushrooms and water lilies are virtually without representation.

3. What are the broader archetypal implications of the occurrence of hallucinogen-symbols, in the Jungian sense? Studies of psychotropism and dream states (e.g., Dobkin de Rios 1972a; Castaneda 1968, 1971, 1972; Van de Castle 1971, n.d.; Harner 1973) associate symbolic content with either the panhuman creation of archetypes or the clairvoyant communication of data otherwise inaccessible in the society, but the exact nature of this content and its relationship to culture are seldom clarified.

4. How are the hypotheses presented here related to those advanced in the literature on altered states? Fischer's (1971) biocybernetic model suggests that cultural creativity from altered states may be dependent on development of religious innovations specifically relating altered states to the rest of culture (cf. Prince and Fischer 1972, Neher 1962); are such innovations supported in the Mayan data? Tart (1972 a,b) suggests that separate realities encountered with the psychotropes may not be understood in terms of "regular" behavioral science; perhaps the "reality" may be recovered by a deeper understanding of Mayan art. In contrast, physicist Walker (n.d.) considers "consciousness" and paranormal events fully amenable to scientific investigation via quantum mechanics. Psychiatrist Grof (1972) demonstrates that LSD hallucination has symbolic content covering the whole of panhuman experience; this would seem a more likely subject for graphic representation than symbols of the hallucinogens themselves. Bourguignon's (1973) study indicates that types of altered states correlate with social structural patterns; presumably such patterns should be found in the use of hallucinogens and related artistic productions, but this is not readily apparent for Mayan art.

Dobkin de Rios's article is meant only to suggest problems for research. However, considering the general weakness of her argument, broader considerations might clarify some questions raised. I hope that Southeastern archeologists will elucidate the following problems:

1. There is little to suggest reverence toward toads. Admittedly, interesting animals usable for artistic designs are limited, and patterns do emerge in specific sites or cultures (e.g., the locust motif of the Late Archaic [Webb 1971] and the owl fetish of Poverty Point [Ford and Webb 1956]). But frog designs appear in Hopewell in the East and are later replaced by toads (or frogs?) in Mississippian. Various species of birds and other animals are equally common from Woodland times on. Thus, information that Dobkin de Rios interprets as supporting her theory among the Mayans finds none of the expected support from diffusion into the Southeast.

2. Similarly, the lily would be expected to have spread to the Southeast in linkage with prevalent water-animal designs, even if lilies were nonpsychotropic. Nothing indicates that this happened except for Mississippian shell ornament "oral accoutrements," similar to Mayan designs described by the author. Various of these seem to indicate language, "sucking" by shamans for curing, fellating prisoners, snake-handling, and, conceivably, "cosmic consciousness" (cf. Hamilton, Griffin, and Willoughby 1952:245-A). Mayan symbols may have similarly varied

meaning, which is to say that hallucinogenesis probably had no greater importance than other events represented by similar motifs.

3. Some Southeastern mushrooms must be psychotropic. Yet (although some bottle stoppers, ear plugs, and stone spatulae may represent mushrooms) the motif did not spread widely with other parts of Mississippian culture coming from Mesoamerica. Although the psychoanalytically oriented will interpret many of such infrequent representations as phallic symbols, I shall not belabor that point, because (a) they are certainly more common in the phallistrewn Mayan area, and (b) it is equally difficult to distinguish phalli from mushrooms among some Mayan motifs.

4. Despite the felony classification for marijuana possession in Texas as late as 1973, use of *Cannabis* is widespread there. Therefore, the idea that use of psychotropes was *verboten* for shamans seems strange. Toads, mushrooms, and lilies being common, continued use of all would be expected, regardless of priests and Spaniards.

5. My impression of Mayan culture and astronomy is that perspectives tended rather to be pluralistic and cyclical than dualistic and temporally infinitesimal. Certainly, Grof's (1972) analysis of over 3,000 therapeutic sessions suggests that use of hallucinogens tends to emphasize and organize the pluralistic (and sometimes dualistic), cyclical, phylogenetic, telepathic, and cosmic. By either interpretation, however, I believe that the writer's broad thesis on the relationship between psychotropes and Mayan art is supported.

by TATIANA PROSKOURIAKOFF

Cambridge, Mass., U.S.A. 28 x 73

De Borhegyi has traced the distribution of mushroom stones and mushroom-shaped pottery objects as evidence of the use of psychotropic mushrooms in ancient religious cults of highland Guatemala. This evidence, with comment by others, is reviewed in Dobkin de Rios's article and is not in dispute; but when the author attempts to ascribe the use of psychotropic drugs to the hierarchs of the Classic Maya civilization, her argument falls apart. Since it does not rest on logical inference, neither concurrence nor refutation is possible.

The author admits that there is not a shred of documentary or archaeological evidence for the use of drugs in the lowlands, but dismisses this fact on the assumption that use of drugs by the populace was suppressed when hierarchs adopted it and later was concealed from the Spaniards. This dubious assumption relieves her of the onus of weighing evidence and leaves her free to "hypothesize" at will. Representations of toads (or frogs) and of water lilies in Maya art she relates to the use of bufotenine and narcotic drugs merely because some species contain these substances. She gives no consideration to the structure of Maya symbolism or to the contexts in which these representations are found. Having no firm argument to stand on, the author falls back on her personal impressions when confronted with the idiom of an unfamiliar art. "For me," she writes, "some of the Maya sculptures have a 'presence' about them that is unpleasantly reminiscent of 'bad trip' phenomena." This may be symptomatic of her state of mind, but it is hardly evidence of the intentions of the Maya artist.

Cosmology and religion receive similar treatment. The preoccupation of the Maya with time is attributed to "a feeling that one is floating in an ephemeral time-space continuum" consequent to the use of drugs. The facts that the Maya calendar was intricately structured, that every period was distinguished by name and endowed with a prognostic potency, that detailed historical annals were kept,

and that astronomers performed difficult calculations on the motions of heavenly bodies are completely ignored.

Intuition plays an important role in science, but it should be a strictly private role. It may point a way, but before we are invited to traverse the distance between the signpost and the goal, the path must be carefully surveyed and shown to be free of quicksands. Direct flights of fancy such as the author offers here should have no place in a scholarly journal, and I think that the referees have been guilty of a serious error of judgment.

by ARTHUR J. RUBEL

E. Lansing, Mich., U.S.A. 13 xi 73

As Dobkin de Rios observes, all of the evidence in support of her reconstruction of Maya ritual during the Preclassic is of a very indirect nature. There are two major missing links in that reconstruction.

First, there is no direct evidence that any of the pre-Spanish Maya used hallucinogens for ritual purposes. It would be helpful to know whether some or all of the psychotropic flora and fauna on which she concentrates our attention are indigenous to the Maya regions. She does address herself to the possibility "that psychotropic mushrooms were important trade items in the southern highlands, where active commerce with other parts of Middle America existed." Of great interest, she points to archeological evidence of trade routes connecting the Maya and central Mexico which passed right through (Barlow 1949:map) the heart of the region in present-day Oaxaca where hallucinogenic mushrooms are so very much in contemporary use for ritual purposes (Heim and Wasson 1958, Miller 1966, Ravicz 1961, Rubel and Gettelfinger-Krejci n.d., Schultes 1972a, Wasson 1966). It is anomalous that there is no mention of any psychotropic substances in the extensive and fairly detailed lists of tribute paid by dominated peoples to their Mexica rulers immediately prior to the Spanish conquest (Barlow 1949).

Another anomaly is lack of any indication in the published ethnographic literature on 20th-century Maya that these groups use hallucinogens in their rituals. It is, of course, possible that such usage was extirpated along with other pre-Christian behavior by the evangelic Catholic priests. If that is what occurred, one could hope for at least spotty survival of such behavior in more isolated areas of the Maya-speaking world. According to Merle Greene Robertson, such may well be the case among some Lacandon. She reports (personal communication, April 6, 1973) observing one group of Lacandons using *Psilocybe cubensis* and *Panaeolus venenosus* in their ritual. She writes that the mushrooms "are placed in the ritual bowls on small stone altars in ancient Maya *oratorios* (places of worship). The purpose of their use, according to the Lacandons, is to contact their gods." More of this kind of direct evidence will lend support to Dobkin de Rios's provocative thesis.

by FRANCISCO SAMARANCH

San Juan, Puerto Rico. 8 xi 73

Dobkin's study endeavors to prove that three common motifs of Mesoamerican art—mushroom stones and mushroom pottery, the frog/toad motif, and the water lily motif—"are related to and influenced by the psychotropic properties of the mushroom, water lily, and toad." Such relationship and influence will be clear if one can demonstrate that these elements were in fact valued *precisely* as bearers of psychotropic substances. This, therefore, should be the point upon which the argument is focused.

Are there documents or at least serious indications that such evaluations ever existed? The paper seems to vacillate on this point.

The author also tells us that "this paper will attempt to shed light on the influence of such psychotropic use on Maya religion." However, this is not an inference from the thesis that is proposed: on the contrary, it is one of the possible premises that would permit one to conclude that the thesis is valid. If, for example, the ritual-religious use of such elements were demonstrated, one would have an explanation of the frequent use of them in art, precisely for their psychotropic value. As I understand it, this is not what is accomplished here. (1) The general exposition of Maya religion refers only to its hierarchical-social aspects. There is no morphological-structural exposition of its basic beliefs or of the body of mythical doctrines it contains, even though this might support the premise. (2) The particular aspects dealt with—maize and the Chac, time, etc.—are only briefly alluded to. The only thing Dobkin says is that what these aspects imply *can be explained* by means of the use of psychotropic substances. It is not even stated that such aspects can *only* be explained in this manner or that this is the *best* explanation.

Since the paper seems rather to deduce ritual-religious use from the frequency of the motifs in art, it seems to me that Dobkin should have had recourse to a different methodology, for example, starting from analogous situations in other cultural contexts in which the coexistence and interdependence of ritual use and the presence of the motifs in art has already been proved and deducing from them that something similar could have occurred here. One could then attempt to reinforce this conclusion, still hypothetical, by searching for other data in its support.

What, precisely, is the argumentative sequence here? Without clarifying this, all that remains is a suggestion of *possible*, not even *probable*, explanations and influences.

by J. ERIC S. THOMPSON

Ashdon, England. 28 x 73

All accept the archaeological evidence for hallucinatory mushroom cults because it is strongly supported by colonial sources and by present-day practices in Middle America. There is continuity from ancient to modern times.

In contrast, not the slightest evidence has come to light in colonial literature or modern studies of such use of toads or water lilies, but we have very full mythological associations for the water lily and the frog, less for the toad.

The amphibian of the rain cult in Yucatec is the onomatopoeic *uo* (from its call, which announces the rains). This is a small edible black frog with a yellowish-red line down its back. Its connections in Maya folklore and art are purely with rain or water. Not being a toad, it has no psychotropic qualities. *Uo* is also the name for the 20-day month, for unknown reasons. Possibly there is a lost lunar association (20 is connected with the moon), or there may have been a lost homonym.

Toads, with what are pretty clearly poison glands, appear on plumbate pottery, rarely on other wares. The makers of plumbate, probably not Maya, commonly represented Mexican (not Maya) deities on their products. In Mexican mythology a toad is the guise of the earth monster. Accordingly, if these plumbate toads are nonrepresentational art, it is highly probable that they reflect the cult of the earth monster. Toads play no part in Maya folklore or art except perhaps as a sort of supporting cast for the *uo*.

There is a large mass of evidence that the water lily represents the large lake in which floated the crocodile whose back was the earth. By extension, the water lily

represents the underworld. It grows from the head of the long-nosed earth representation of Itzam Na; its flowers adorn the earth crocodile and the jaguar, denizen of the underworld. Its glyph (Imix) symbolizes both underworld and water.

It is surely rash to substitute for such strong mythological associations the theory that we are faced with representational evidence that the Maya used toad and water lily in hallucinatory rites. Apparently, the properties of the two have become known to science only in recent years; that they were known to the Maya finds no support from any observations by outsiders from the conquest to the present or from Maya colonial writings. Furthermore, in the large Yucatec medical literature, the water lily is absent; the toad (*much*) appears only once, its ashes being used for nose-bleed.

by ROGER W. WESCOTT

Madison, N.J., U.S.A. 20 x 73

Dobkin de Rios is to be congratulated for her clear, succinct, and persuasive overview of the effect of psychoactive biota on Mayan symbolism. It is particularly refreshing to note her willingness to introduce first-person experience of ayahuasca into her discussion of analogous substances from Central America.

What is most striking about the relation between toads and mushrooms on the one hand and frogs and water lilies on the other is that both associations are, in psycho-analytical parlance, "overdetermined." Toads are related to mushrooms not only by the fact that both yield hallucinogens but also by the fact that both appear, with comparative suddenness, after rains. And frogs are related to water lilies not only by the fact that both yield hallucinogens but also by the fact that frogs sun themselves on lily pads. And it does not seem far-fetched to me to posit a further experiential metaphor in this biotic-meteorological complex: the succession of rain and sunshine just cited recalls, and may well symbolize, the subjective death and rebirth experience noted by Arnold Ludwig as typical of profoundly altered states of consciousness.

Reply

by MARLENE DOBKIN DE RIOS

Fullerton, Calif., U.S.A. 30 x 73

I would like to thank all of those who have taken the time to read and comment on my article. For the record, I think it must be mentioned that this article was written in late 1970 and sent to CA in May 1971. Since then, various publications on plant hallucinogens have contributed new botanical and ethnological data. I have published a book on my field research with ayahuasca in the Peruvian Amazon (1972a), a doctoral dissertation on the subject (1972b), and a monograph prepared for the National Commission on Marihuana and Drug Abuse (1973) which surveys the use of hallucinatory agents in non-Western cultures in order to discover common hallucinogen-linked themes. I have also examined the role of hallucinogenic plants in Moche art of Peru (n.d.) and published, with Oscar Janiger, a study of the possible hallucinogenic properties of *Nicotiana* sps. (Janiger and Dobkin de Rios 1973, 1974).

This research has shown, for the most part, that Westerners have been biased in not conceding the influence of plant hallucinogens in related areas of culture. Far too often, hallucinogenic drugs are relegated in ethnographies

to a section on technology and material culture, while the author neglects drug-induced states of consciousness or fails to connect them with the cultural realm, be it symbols, mythology, folklore, or art.

In preparing this paper on the Maya, I did not intend to indicate that hallucinogenic plants are the only way that consciousness is altered in traditional societies. As Bourguignon has written (1973), consciousness alteration is found in over 90% of the societies represented in the Human Relations Area Files and is accomplished by a wide array of sensory deprivation and sensory overload techniques (see also Dobkin de Rios 1972a: chap. 2). I have focused on hallucinogenic plants, since there is ethnohistorical evidence for widespread drug use among Mesoamerican groups such as the Aztec, Huichol, etc. Had this article been written after Janiger and I had begun examining the possible hallucinogenic properties of tobacco, greater prominence would have been given to the influence of *Nicotiana* in Maya culture. As we have argued, norharman and harman, both of which have hallucinogenic properties, have been isolated in the smoke condensates of common Virginia blends of tobacco. Certainly New World Indian societies have utilized tobacco as if it were a hallucinogen in their diverse magico-religious rituals.

I am saddened to see that two renowned Maya scholars, Thompson and Proskouriakoff, are unwilling to accept hypothetical speculations on Maya drug use. If we are able to establish or even suggest that psychotropic substances may have been used by the Maya, we must go on to examine the way in which the effects of the plants may have influenced belief systems, art, and symbols.

Proskouriakoff seems to opt for a separation of themes dealing with the narcotic properties of drug plants and symbolic structures. Such a distinction is spurious. Barnard (1966), in her study of mythmakers (e.g., her chapter entitled "The God in a Flowerpot"), does not use myths to shed light on the origins of a peyote cult, but uses what we know about peyote to shed light on the myth. In Barnard's opinion, plants portrayed in other myths are not necessarily imaginary. Their mythical uses may be derived from their cult use, extended by hyperbole until the plant itself becomes mythical in songs and retold tales.

Thompson, too, is wary of accepting the possible influence of hallucinogenic plants on Maya culture, preferring to view frogs (*not* toads) and water lilies in their full mythological associations rather than in terms of their hallucinogen-linked properties. Crumrine has contributed greatly here with his citation of Turner to the effect that ritual symbols incorporate a fan of meaning. The toad and water lily motifs may refer to a range of related areas—rain, water, fertility, and hallucinogenic powers. Wescott concurs on this point.

Thompson cites the lack of evidence for hallucinogenic toad or water lily use in colonial literature or contemporary ethnographies. As Schultes has repeatedly pointed out, finding such evidence would always be a difficult task, since not all the ethnohistoric materials have been fully published (witness Hellmuth's comment) and the facts may not often have been shared with the conquerors. I cannot understand Thompson's insistence that the frog, and not toad, motif is in question. The common *Bufo marinus* toad, rampant in Mayaland, is a reasonable candidate for much of the art. Moreover, bufotenine is not the only psychotropic extract available in the toad. A substance found in *Bufo alvarius*, another species of American toad, contains a large quantity of an indole alkaloid 5-Methoxy-N, N-dimethyltryptamine (Erspamer, cited in Furst 1972a:45). Furst is certainly right in thinking it possible that the hallucinogenic properties of the toad were known in Mesoamerica. Despite Alger's view that the simple shaman could not have attained

the Westerner's pharmacological knowledge of drug plants and their alkaloidal extraction, we know that shamans have been very clever indeed. In a report on my work on the North Coast of Peru, where the mescaline cactus *Trichocereus pachanoi* is ritually used in healing (Dobkin de Rios 1968a,b), I mentioned that the plant *condorillo* (*Lycopodium* sp.) was also so used. Alger told me at the time that in industrial societies such species were once commonly used to manufacture pill coatings. Schultes (1972b) has since written that *Lycopodium* sp. possesses hallucinogenic properties. Other examples of shamans' having the inside track in drug knowledge could be cited in this context.

Rubel argues that if drug use had been extirpated by Catholic priests, we should expect some spotty survivals. The comments of Furst on toad use partially fill this gap in our knowledge. I have seen an artifact on exhibit at the National Museum of Anthropology in Mexico City which portrays a water lily, lightly colored blue, with a human figure rising out of its center. I await further biochemical studies of the properties of the water lily and do not think it premature to "jump into print," in Furst's words, with this material. As I understand the scientific paradigm, hypothesis building and testing are appropriate. The lack of ethnographic evidence among contemporary Maya does not surprise me. My research with ayahuasca made me aware that drug use was going on right under the eyes of disinterested residents of Iquitos, a city of 120,000. While I worked with a transitional Indian group who used ayahuasca in the treatment of disease, I found middle-class Mestizo residents of the city virtually ignorant of drug rituals that often took place within three to five miles of the downtown area.

By the same token, I hesitate to assume that because data has not been codified for us by a Westerner it does not exist. Blum (1969), in his survey of the Human Relations Area Files, found that Western writers recognized data on the use of alcohol and tobacco with the greatest accuracy, because of the cognitive clusters of their own culture, but often remained unaware of nearby drug use. Harner (1968) has written that he did not accord full significance to the role of plant hallucinogens among the Jivaro until he himself had occasion to take ayahuasca with his informants. If interested anthropologists recount this sort of experience, I wonder how zealous missionaries can be expected to have given full and sensitive treatment to drug-linked beliefs they attributed to devil worship. Robertson's report to Rubel that contemporary Lacandons use the *Psilocybe* mushroom, a potent LSD-like substance, is interesting, as is Hopkins's mention of Lowy's recent discovery of the hallucinogenic mushroom *Amanita muscaria* in highland Guatemala and his own evidence that it may be found in Chuj country along with *Datura* sp. and *Erythrina* sp.

Recently, I have attempted to delineate a more precise methodology for the study of the effects of plant hallucinogens on prehistoric peoples where adequate written evidence is lacking (Dobkin de Rios n.d.). I appreciate Samaranch's comments on the methodological difficulties of this study and only wish to reiterate that I viewed the article as a means of posing questions. As a nonspecialist in Maya studies, I wished to examine my own area of expertise—hallucinogens and culture—in an attempt to interpret some of the prehistoric religious beliefs of the Maya. Samaranch suggests that a more fruitful approach would be to start from a contemporary situation where hallucinogenic drugs are used and influence art, and then apply those insights to historical data. Another possibility (suggested to me by Alan R. Beals) would be to examine paired societies, exploiting similar ecological niches, of

which only one uses hallucinogens; a comparison of their art could attempt to isolate drug-linked traits. These approaches may be fine methodologically, but unfortunately there is a dearth of societies available for such study.

Comments on Long's provocative questions concerning the demonstrable effects of hallucinogens on graphic arts are in order. In this study, I argued from the representation of presumed drug flora and fauna to the effects on states of consciousness and beliefs linked to supernatural realms. Another way one can proceed is by examining the influence of hallucinogens on abstract art in general. Barber (1970) has pointed out that the LSD-like experience neurologically changes retinal image so that one perceives cones, lattices, and other geometric forms through the geometric structures of one's eye. In my study of Moche art (and there is ritual mescaline use on the North Coast of Peru today), I could not proceed in this way, since Moche pottery has been said to be realistic. I argue, however, that Moche potters portrayed supernatural components of their universe which plant hallucinogens permitted them to experience directly. Long's point is well taken, and a study aimed at discovering whether there are definite hallucinogen-linked symbols as well as a portrayal of psychotropic flora and fauna or geometric forms in art remains to be done.

Landar says that I assume that all Maya symbols mean the same things to all Maya. From a pharmacological point of view, we are examining a group of stimuli—hallucinogens—which effect man's central nervous system in a patterned and predictable way. Had hallucinogenic flora or fauna been used in diverse regions by a variety of Maya "tribes," the presence of shared symbols among them could be related to the limiting effects of the stimuli in question or to the relatively finite number of symbolic responses man makes to hallucinogenic experience. Grof (1972) found highly patterned symbolic representations in over 3,000 Western LSD-psychotherapy sessions, despite the fact that his patients were not members of the same "tribe" and shared neither education, background, or other social circumstances. Landar's dead-ended particularistic focus may reflect what one commentator refers to as the conservatism of Maya scholarship.

Landar also comments that in Mesoamerica drugs are the esoteric property of sorcerers and carefully selected apprentices. In a recent study of the ayahuasca materials (1974), I show that in the Peruvian Amazon drug information is common knowledge and part of the symbolic environment. Landar's comment misses the point. What I have argued extensively for elsewhere, in light of Wallace's (1959) seminal study of the cultural determinants of hallucinatory experience, is that antecedent variables such as belief systems, attitudes, values, and expectations interact with the consequences of the drug to enable us to predict drug effects. Simply speaking, in a culture where hallucinogenic drugs were used, we can argue that some segments of the society had knowledge of the drug plants, their presumed effects, the belief system connected with their use, etc.

It is possible that I have overstated my case with regard to cultural evolution and elite usurpation of drug use. I do not, however, argue, as Furst suggests, that no drug use occurred at the folk level once usurpation took place. As every introductory anthropology text instructs, one must be careful to distinguish between authority and power. I based my arguments on the idea of legitimacy rather than police-state enforcement and cited the grave robbing of Kaminaljuyú Tomb I to illustrate my point. The commentators seem to disagree concerning the Andean data on coca. Moreover, I would guess that we are probably dealing not with the single stimulant coca, as Furst argues, but rather with a complex admixture of hallucinogenic

stimulants and alcohol, which may have included various *Datura* species and possibly hallucinogenic cacti as well.

I am pleased that La Barre has seen the significance of the relationship between hallucinogenic drug states and primitive concepts of time. In my recent study of the cross-cultural use of hallucinatory agents (1973), I point out that the theme of repetitive time and the experiencing of the cyclicity of time occurs with frequency in a variety of non-Western societies where plant hallucinogens are used ritually.

I am grateful for this opportunity to examine Maya art from the perspective of one interested in ethnobotany and culture. Unlike some writers, I do not wish to suggest that we can reduce all of Maya culture to a series of drug-induced inputs. Rather, I believe that anthropologists must become more sensitive to the role of sacred plants in cultures around the world and not permit their own cultural blinders to prevent them from recognizing their significance.

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